GOODS CONVEYANCE MECHANISM

BACKGROUND OF THE INVENTION

[0001]

Field of the Invention

The present invention relates to a conveyance mechanism mainly used in a goods conveyance system of eating and drinking place using carrying means to carry goods from the kitchen to customers' dining area.

[0002]

Prior Art

Self-service restaurants including a revolving sushi restaurant often use a belt-conveyer type conveyance mechanism in a goods conveyance system to carry goods, such as dishes, beverages and the like, from the kitchen to customers' dining area. In the belt-conveyer type of conveyance mechanism opening at its top and sides, the customers can directly look at their gradually coming orders through their eyes.

However, in the type of the conveyance mechanism disposed in an inside of a tunnel-type of passageway, the customers cannot visually confirm how and whether their orders are conveyed. In order to selectively deliver the goods ordered by a customer to the customer's table, the conveyance mechanism having the tunnel-like passageway is provided with a select mechanism which is structured to selectively push the specified order from the passageway to the customer's table.

[0003]

This type of conveyance mechanism using the tunnel-like passageway

has the disadvantage that since the customers cannot visually confirm the course of conveyance of their order to the customer's table, they may feel inconvenience or bored.

When the customers can acquire cognizance of the course of conveyance of the order, they can take pleasure in waiting for the order, while on the other hand, when they do not acquire any information on the order until the order is actually delivered to the customer, the customers are sometimes anxious about whether their order is surely introduced into the kitchen or until when they are kept waiting.

[0004]

In consideration of the disadvantages mentioned above, the present invention has been made. It is the object of the present invention to provide a goods conveyance mechanism having the function of displaying the course of an order carried from a goods supplying place to a goods receiving place by use of a gradually changing image in the goods receiving place.

[0005]

SUMMARY OF THE INVENTION

A goods conveyance mechanism according to the present invention comprises carrying means for carrying goods from a goods supplying place to a goods receiving place; image display means provided in the goods receiving place; and control means for allowing an image displayed on the image display means to change one after another in accordance with developments of the goods carried up to the goods receiving place by the carrying means.

[0006]

In the goods conveyance mechanism, order input means for inputting information on goods ordered is provided in the goods receiving place, and order display means for displaying the information on the ordered goods input from the goods receiving place is provided in the goods supplying place.

[0007]

Further, a goods conveyance mechanism may comprise selective carrying means for selectively carrying goods from a goods supplying place to a designated place of a number of goods receiving places; a touch screen display, provided in the goods receiving place, serving both as image display means and as order input means for inputting information on goods ordered; order display means, provided in the goods supplying place, for displaying information on a corresponding place to the goods receiving place where the information on goods ordered is input and on the ordered goods; and control means comprising a menu display function of displaying the information on a list of goods on the touch screen display provided in the goods receiving place; an information function of giving the information on the selected goods to the goods supplying place when an orderer touches the touch screen display to select any item among the list of goods displayed on the touch screen display; and an image control function of allowing an image displayed on the touch screen display to change one after another in accordance with developments of the goods carried from the goods supplying place up to the designated goods receiving place by the selective carrying means, to give the information on the arrival of the order to the orderer.

The construction of the present invention mentioned above can provide

a visual confirmation of the course of the delivery of the ordered goods by the sequentially changing image, even when a tunnel-like passageway is used to conceal the conveyance of the order from view.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008]

FIG. 1 is a plan view showing the entire structure of an embodiment of a goods conveyance mechanism according to the present invention;

FIG. 2 is an enlarged perspective view of a principal part of the goods conveyance mechanism;

FIG. 3 is a block diagram of the goods conveyance mechanism; and

FIG. 4 is an illustration showing an example of an image control function of the goods conveyance mechanism.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0009]

In the following, description is given to a goods conveyance mechanism according to the present invention with reference to the accompanying drawings showing a certain preferred embodiment.

[0010]

Shown in FIG. 1 is a plan view of a principal structural part of a goods conveyance mechanism 10 of a belt-conveyor sushi shop using the goods conveyance mechanism according to the present invention.

In FIG. 1, 1 denotes a kitchen where a variety of goods including sushi are prepared. 2 denote a customer's table including a table 21 and seats 22. 3 denotes belt-conveyor-type carrying means that is structured to carry a variety of goods including sushi prepared in the kitchen 1, going round

before the customers' tables 2.

[0011]

The carrying means 3 is structured to carry the goods through the tunnel-like cover, and also selectively deliver a goods ordered by a customer to the customer at the specified table. For this selective delivery, there is provided a select mechanism 4 at a location near each of the customers' tables. The select mechanism 4 is so structured that it can read identification information on the carried goods to select the ordered goods among the carried goods and feed it out from an outlet 41 arranged on the table.

The select mechanism 4 may use any suitable mechanism, including a swing lever type, a parallel belt type and a retractable lever type.

[0012]

FIG. 2 is a perspective view of the select mechanism 4 as viewed from the customer's table side.

In FIG. 2, 5 denotes a touch screen display which is disposed in proximity of the outlet 41 on the table, for example, on an upper side of the outlet 41.

The outlet 41 opens onto the surface of the table 21 in such a manner as to open and close. The outlet 41 is provided with an open-and-close cover 42 which is controllably actuated to open and close by a cover drive motor 43. The open-and-close cover 42 serves to prevent dusts and the like from coming into the tunnel-like passageway from the outlet 41.

The touch screen display 5 comprises a touch screen of liquid crystal display and a touch sensor loaded in a front face of the liquid crystal display

and has the function of outputting an image specified by the customer who selects a certain image from the images on item information and the like displayed on the touch screen and touches it with his/her finger.

In addition, the touch screen display 5 includes a microphone 51 and a speaker 52 which are disposed at the lateral side of the touch screen display 5.

[0013]

FIG. 3 is a block diagram for illustrating a control system of the goods conveyance mechanism according to the present invention.

In FIG. 3, 6 denotes a control unit, which has an image control function of controlling the image as is displayed on the touch screen display 5 at the customer's table 2 through a data output line 61; a voice synthesis function of emitting a synthetic voice from the microphone 51; a voice recognition function of recognizing audio signals output from the speaker 52; and a data input function of recognizing the information on the image as was touched on the touch screen display 5 through a data input line 62.

[0014]

The control unit 6 further has an information function of displaying the information on the content and place of the order on a monitor 7 set in the kitchen 1; a ready-state detection function of receiving ready-state signals, which are output from an order-in-ready-state switch 63 set in the kitchen 1, through a ready-state-signal input line 64 and of detecting the timing at which the order was set on the belt of the carrying means 3; a call control function of connecting between a responsible cook or person in the kitchen and a selected customer via the microphone and speaker set in the

kitchen; and an arrival detection function of receiving through an arrival signal line 66 arrival signals as are output from an arrival detecting sensor 65 for sensing the order coming near to the designated customer's table 2 to detect the timing at which the select mechanisms 4 is actuated.

[0015]

Further, the control unit 6 has a customer detection sensor 23 for detecting the presence of customers at the customer's table and outputting the customer detection signals to the control unit 6. The customer detection sensors 23 which may be used include an existing photo-reflective sensor, pyroelectric infrared sensor and pressure sensor set in the seat 22.

Those equipments mentioned above, including the touch screen display 5, are set in each of the customers' tables.

[0016]

The kitchen 1 corresponds to the goods supplying place recited in Claims; the customer's table 2 corresponds to the good receiving place recited in Claims; the touch screen display 5 corresponds to the order input means and image display means recited in Claims; the carrying means 3 and the select mechanism 4 correspond to the selective carrying means recited in Claims; and the monitor 7 corresponds to the order display means recited in Claims.

[0017]

In use, when a customer takes a seat 22, the customer detection sensor 23 outputs the customer detection signals to the control unit 6.

When receiving the customer detection signals, the control unit 6 operates to switch a standby screen display on the touch screen display 5 to

a screen display of a greeting image. The greeting image is, for example, an animated cartoon of a character of a food serve in uniform of the restaurant or shop that makes greeting to customers. In sync with the screen display of the greeting image, the animated character bows in salutation, speaking "Welcome" to customers by a synthetic voice through the speaker 52.

Then, the screen display of the greeting image is switched in sequence to a screen-shot of demonstrating how to order and pay and then to another screen-shot of presenting a list of goods available in the restaurant or shop and a brief explanation thereof. In sync with the screen-shots, the contents corresponding to the respective screen displays are announced by voice through the speaker 52.

[0018]

An example of menu demonstrating images displayed by a menu display function of the control unit 6 is described here.

The menu demonstrating images, mainly displayed on the screen-shot of demonstrating "how to order sushi", are moving images of a variety of fishes of stuff of sushi, which are depicted as if they are swimming under water and are displayed one after another. When the customer touches the screen on any selected image of fish, a brief explanation about the fish and about the sushi using the fish as the stuff of sushi is given by words and images and, if required, by voice. The customer makes his/her order by touching twice the same image of fish or touching the order button. Also, he/she can cancel the order by touching the cancel button shortly after he/she has made the order. The images displayed are not limited to the

fishes, but a variety of goods may be displayed, including other stuffs of sushi, soups, deserts and drinks such as beer. These menu demonstrating images appear one after another.

[0019]

When the customer touches the switch button at the corner of the menu demonstrating screen-shot, the menu demonstrating screen-shot can be forcibly switched to another menu demonstrating screen-shot.

Alternatively or additionally, the customer can make the order through the microphone 51 by means of voice input.

The animation may be made so that when the order is made, an animated cartoon of character of cook, food serve or the like appears on the screen and puts some words, such as e.g. "Would you like Wasabi ?", in its mouth by synthetic voice, to make sure the details of the order, or present "Today's Recommendation".

[0020]

When the customer determines his/her order by designating the order for goods and the number of goods in the manner mentioned above, the information on the place and content of the order is displayed on the monitor 7 set in the kitchen 1 by the information function of the control unit 6. The information on the place of the order means the information on the table number and the like corresponding to the orderer's table, and the information on the content of the order means the information on the kinds of goods, the number of the goods, and the like.

The responsible cook or person takes a look at the information and gives proper instructions to the working stuffs, for preparation of the

ordered goods.

The order as is in ready state is placed on the dish having individual identification information and then is set on the carrying means 3. Then, the responsible cook or person presses the order-in-ready-state switch 63. The order-in-ready-state switch 63 may be replaced with a touch screen display for kitchen use.

Then, the control unit 6 detects the order fed out from the kitchen by its image control function. Then, it calculates the time required for the order to be carried up to the orderer's table from the traveling distance between the kitchen and the orderer's table and the traveling speed and displays "an animated conveyance-suggestible image" on the touch screen display 5 at the customer's table, as illustrated in FIG. 4.

[0021]

As illustrated by an example in FIG. 4, the animated conveyance-suggestible image of a character of "Lucky bird" appears at the corner of the screen, as shown in FIG. 4(a) and then is gradually zoomed in, as shown in FIG. 4(b) and 4(c), to suggest that the order is coming near to the orderer's table. The animated cartoon of the character of "Luck bird" may be depicted as carrying the ordered goods by its claw or bill. Additionally, in sync with the display of the animation, some music may be put on.

In timing with the arrival of the order to the designated customer's table, the animated conveyance-suggestible image becomes largest and the action of the animated bird putting the order on the table is displayed at the bottom of the screen, as shown in FIG. 4(d).

[0022]

The arrival of the order can be confirmed by the identification data being read by the arrival detecting sensor 65 disposed in the select mechanisms 4 at the customer's table, as well. The driving motor 43 is controllably driven to open the open-and-close cover 42 in timing with the order being taken out from the belt of the carrying means to the orderer's table.

Thus, the order can be taken out from the outlet 41 arranged on the table.

The display of "the animated conveyance-suggestible image" on the screen at the customer's table provides a visual confirmation of the conveyance of the customer's order, and as such can allow the customer to find joy in waiting for his/her order without being irritated.

It is to be noted that the customer can switch the animated conveyance-suggestible image to the menu demonstrating screen-shot, such as the screen-shot of demonstrating "how to order sushi", at any time even when the animated conveyance-suggestible image is displayed on the screen. Alternatively, the menu demonstrating screen-shot may automatically be inserted in adequate timing, to prompt the customer to input the order.

[0023]

Modification may be made so that "the animated conveyance-suggestible image" can start to be displayed from immediately after the order is made.

In this modification, for example, such an animation may be displayed that the ordered goods, e.g. "*nigiri-zushi*", is made up by "the animated

character of cook", then is put into the hands of "the animated character of Lucky bird", and then is gradually coming near to the customer's table.

The display of this animation provides a visual check on the preparation of the customer's order from immediately after the order is made, and as such can prevent the customer from feeling bored.

Preferably, the goods and characters displayed are presented in the form of 3-D scenography to provide a more realistic display.

The animated characters of "cook", "food serve" and "Lucky bird" may be selected according to the customer's preference.

[0024]

The animated images may be displayed in accordance with the developments of the conveyance of the order by controllably increasing or decreasing the display rate when the previously produced animated image file is reproduced under control of the control unit 6. Alternatively, several image files each having different playback time may be prepared in advance so that the image file having the playback time proper for the place of the customer can be selectively displayed. In the latter case, since the distances between the kitchen and the respective tables are fixed and also the speed of conveyance is constant, the time required for the order to arrive at the respective tables can be calculated in advance. Thus, when several image files having the playback time proper for the respective tables are prepared in advance and, when playing back, the image file proper for the place of the customer is selected, there can be provided the advantage of reducing the burden of the control unit when processing the image.

Alternatively, in playing back the animations, the texture data of the

animated characters selected may be subjected to texture mapping by an animation display engine, to synthesize the images in sequence while being played back. This can provide the advantage of saving the required capacity for the image files.

Further, microcomputers each having the image processing function may be arranged in the customers' tables, respectively, so that a minimum amount of data on various control signals and order information can be communicated between the microcomputers and the general control unit that controls the overall data so that the distributed data processing of generation of animated images of characters and the like can be provided by the respective microcomputers at the customers' tables. This can provide the advantage of reducing the data transmission amount between the kitchen and the respective customers' tables.

[0025]

While in the description above, the application of the goods conveyance mechanism of the present invention to the supply of sushi was taken as an example, the goods conveyance mechanism of the present invention is applicable to a variety of goods supply services including food services including fast food shops, without being limited to the application to the supply of sushi.

Further, the goods conveyance mechanism of the present invention is applicable to food outlet services, such as a pizza delivery service, using an online application (Internet), without being limited to the application to the conveyance in the inside of the shop.

Also, the construction of the present invention wherein "the animated

conveyance-suggestible image" that changes in accordance with the status of progress of preparation of the order is displayed on the display screen at the orderer's table is also applicable to distributive goods supply services of custom-made goods using the online (Internet) application. This can provide the advantage that the orderer can visually check the status of progress of the preparation every time when connecting with a server of the goods supply service.